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# GLOBAL HARMONIZATION OF SYSTEMS OF CLASSIFICATION AND LABELLING OF CHEMICALS

## Physical hazards
## Definition for aerosols and criteria for flammable aerosols

Transmitted by the expert from the United States of America

1. The definition for aerosols used in United States transport regulations differs from that in the UN Recommendations in several respects. The United States definition is as follows:

> "Aerosol means any non-refillable metal receptacle containing a gas compressed., liquefied or dissolved under pressure, the sole purpose of which is to expel a non poisonous (other than a Division 6.1 packing group III material) liquid, paste or powder and fitted with a self-closing release device allowing the contents to be ejected by the gas."

The significant differences are:

- the definition only allows metallic aerosol containers,
- Division 6.1 substances in packing group I or II are not allowed,
- aerosol containers filled only with a gas are not authorized to be treated as aerosols.

In transport, the effect of these restrictions is that aerosol-like containers which meet the UN definition of aerosol but which do not meet the United States definition are not eligible for treatment as limited quantities. For example, under the United States definition, aerosol containers made of glass or plastic and aerosol-like containers that are only charged with a gas, would only be subject to limited quantity provisions if their capacity was 120 ml or less.

2. Under United States regulations criteria for flammability vary according to the intent of the regulations with most regulations using a performance criteria.

3. United States transport regulations define flammable aerosols on the basis of the performance criteria provided in the ICAO Technical Instructions. The definition:

> "an aerosol is considered flammable if a test of the aerosol produces any one of the following results:
>
> 1) with the valve fully open the discharged material is capable of being ignited by a flame applied for a period of 5 seconds at 150 mm from the valve orifice and the resulting flame length in the horizontal plane exceeds 450 mm, or with any degree of valve opening the flame flashes back and burns at the valve (this test is commonly referred to as the flame projection test); or
>
> 2) with the valve fully open the discharged material when directed into an open ended vessel containing an internal ignition source causes significant propagation of flame; or
>
> 3) with the valve fully open the discharged material when directed into a closed vessel containing an internal ignition source causes an explosion or rapid burning."

4. United States consumer protection regulations use the flame projection method described above but make a distinction between flammable and extremely flammable aerosols. These definitions are as follows:

> "An aerosol is classified as extremely flammable if when tested by the flame projection method (described in above) a flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening and the open cup flashpoint is less than 20 °F (-6.7 °C)."
>
> "An aerosol is classified as flammable if when tested by the flame projection method (described in above) a flame projection exceeding 18 inches is obtained at full valve opening, or flashback (a flame extending back to the dispenser) is obtained at any degree of valve opening."

5. United States workplace safety regulations use the flame projection test method as described above for classifying aerosols. They do not make a distinction between extremely flammable and flammable aerosols.

6. Based on extensive testing, the performance criteria given above have been determined to be insufficient for evaluating the fire risk associated with warehouse storage of aerosols. For purposes of storage, the National Fire Protection Association classifies flammable aerosols according to the heat of combustion of the contents. The three different classes are as follows:

| | |
|---|---|
| Class 1: | total heat of chemical combustion that is less 20 kJ/g (8,600 BTU/lb); |
| Class 2: | total heat of chemical combustion that is greater than 20 kJ/g (8,600 BTU/lb) and less than or equal to 30 kJ/g (13,000 BTU/lb); |
| Class 3: | total heat of chemical combustion that is greater than 30 kJ/g (13,000 BTU/lb). |